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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/575,675

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Igor Khrushchev

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Buchanan Intellectual Property Office LLC

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EXAMINER

LEUNG, QUYEN PHAN

ART UNIT

PAPER NUMBER

2834

MAIL DATE

DELIVERY MODE

10/03/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/575,675	Applicant(s) KHRUSHCHEV ET AL.	
	Examiner QUYEN P. LEUNG	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10,12-26,28-42,44-56,58-61 and 63-72 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,3,12-16,18,26,28-31,51-53,56,58-60 and 69 is/are rejected.
- 7) ☒ Claim(s) 4-10,17,19-25,32-42,44-50,54,55,61,63-68 and 70-72 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>20080527</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Amendment

In response to applicant's amendment filed 5/27/2008 and resubmitted 6/20/2008, claims 2, 11, 27, 43, 57 and 62 have been canceled; claims 63-72 added; and claims 1, 3-6, 8, 10, 12-14, 16, 17, 18-26, 28-36, 39-42, 44-46, 48-51, 53-56, 58, 60-61 amended. Claims 1, 3-10, 12-26, 28-42, 44-56, 58-61, 63-72 are pending.

Information Disclosure Statement

The information disclosure statement filed 5/27/08 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

The information disclosure statement filed 5/27/08 fails to comply with 37 CFR 1.97(c) because it lacks a statement as specified in 37 CFR 1.97(e). It has been placed in the application file, but the information referred to therein has not been considered.

The information disclosure statement filed 5/27/08 fails to comply with 37 CFR 1.97(c) because it lacks the fee set forth in 37 CFR 1.17(p). It has been placed in the application file, but the information referred to therein has not been considered.

Response to Arguments

Applicant's arguments filed 5/27/2008 and resubmitted 6/20/2008 have been fully considered but they are not persuasive. Applicant made the following arguments:

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- *The Applicants have herein amended independent claims 1, 26, and 51 to include a limitation relating to a lower refractive index.*
- *if Will is interpreted to disclose altering the refractive index, there must be either an increase or a decrease, Will fails to explicitly disclose a decrease in the refractive index as is explicitly required by the claims as amended herein.*
- *The Examiner has failed to provide the required basis in fact or technical reasoning to support a determination that a decreased or lowered refractive index necessarily flows from the teachings of Will. Indeed, such a decrease in the refractive index would be counter to the usual expectations since the known use of lasers in glass increases the refractive index.*

In response to the arguments above, examiner would like to point out that there are six independent claims, as amended. They are claims 1, 13, 26, 51, 58, and 60. It is agreed that claims 1, 26, 51 and also claims 58 and 60 include a limitation relating to a lower, or depressed, refractive index. *However, it is noted that claim 13 is broader than that and includes a broader limitation relating to a change in refractive index.*

In any case, it is agreed that the **Will reference** anticipates both an increase and a decrease by teaching “altering the refractive index”. Examiner submits that this jibes in the context of Will, because it teaches **not only glass**, as specifically argued by applicant above, but also ceramics and **crystals**, as evidenced by the English language translation of Will DE 10155492 provided with 12/26/2007 communication, on page 6 of 8, in the third paragraph from bottom:

In surprising way the invention was not to individual glasses limited to separate could with many transparent materials, as for example Glasern, glass ceramics and crystals be essentially realized.

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Per evidence of record, it is agreed that a laser pulsing in **glass** results in an increase the refractive index. See art of record Borrelli (2002/0076655) and in particular

(57)

ABSTRACT

The invention relates to methods of writing a light-guiding structure in a bulk glass substrate. The bulk glass substrate is preferably made from a soft silica-based material having an annealing point less than about 1380°K. A pulsed laser beam is focused within the substrate while the focus is translated relative to the substrate along a scan path at a scan speed effective to induce an increase in the refractive index of the material along the scan path. Substantially no laser-induced physical damage of the material is incurred along the scan path. Various optical devices can be made using this method.

the abstract:

Further, it is noted that **glass** or silica-based material generally the composition of SiO₂, as evidenced by Borrelli paragraph [0055], which are **not crystal**.

[0055] In binary boron-doped silica-based systems, the borate content can comprise up to 20 wt.% or more borate. For example, the binary glass systems 9 wt.% B₂O₃- 91 wt.% SiO₂ and 20 wt.% B₂O₃- 80 wt.% SiO₂ can be used to practice the invention. The annealing point of the 9 wt.% B₂O₃- 91 wt.% SiO₂ composition is about 1073° K. The annealing point of the 20 wt.% B₂O₃- 80 wt.% SiO₂ composition is about 999° K.

However, since applicant claims altering or lowering the effective refractive index of **a crystal** by laser pulsing in independent claims 1, 13, 26, and 58, or lowering the refractive index of a material in claim 51, or a laser having a depressed cladding in claim 60, it is noted that Will anticipates the claimed invention, to the extent as applied in the prior Office Action and below.

Claim Objections

Claim 7 is objected to because of the following informalities: in claim 7 line 2, the recitation of **preferably** makes the claim unclear whether or not the limitation is required or optional.

Claim 63 is objected to because of the following informalities: there is no ending period. Appropriate correction is required.

Claim 69 is objected to because of the following informalities: "chromium titanium Tm" should be separated by commas. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12, 16, 35, 47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 12 and 16 each depend on canceled claim 11.

Claim 35 depends on canceled claim 27.

Regarding claim 47, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 26, 28-29, 51-53, 56, 58-60 are rejected under 35 U.S.C. 102(b) as being anticipated by Will et al (DE 101 55 492).

Re claims 1, 3, 56, see figures 1-6 for a method of altering the refractive index of a region of a crystal comprising **focusing** a pulsed laser beam at a desired position within the crystal and **moving** the focused beam along a path such that the focused beam alters the refractive index of the region of the crystal along the path.

It is inherent that the refractive index is altered because Will et al teaches a waveguide that is formed. A wave is guided when the surrounded by material of lower refractive index. Re the focusing optics, see figure 1 elements 2, 7. Re the pulsed laser beam, see figure 3 for the parameters of pulse energy and pulse duration. Re the crystal, see figure 1 element 4 for the optical transparent material and in claim 9 lines 5-6 of Will et al (reproduced below) suggesting crystal (Kristalle) as a material choice for element 4. Re moving the focused beam along a path, note figure 5 which shows the writing method and in particular note the xy-stepper and z-stepper which move the laser beam relative to the crystal (4).

Fig. 1: Setup for Direct Waveguide Writing

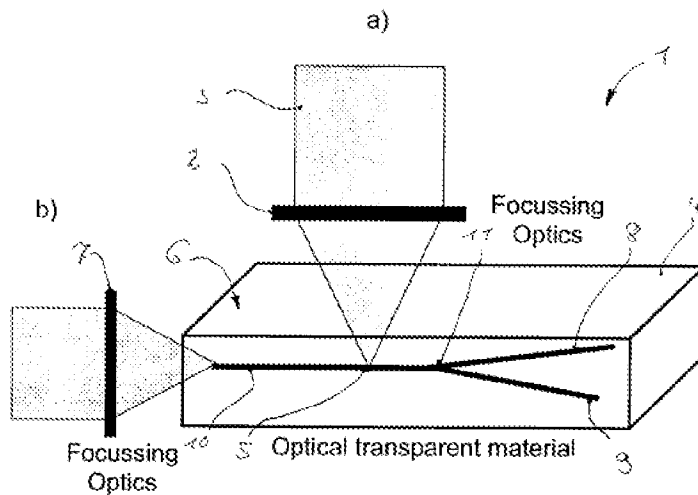


Fig. 3: Splitter Writing Method
(Example 1 X 2 Splitter)

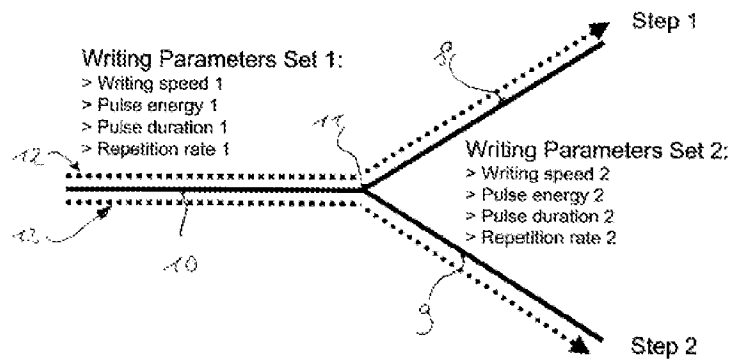
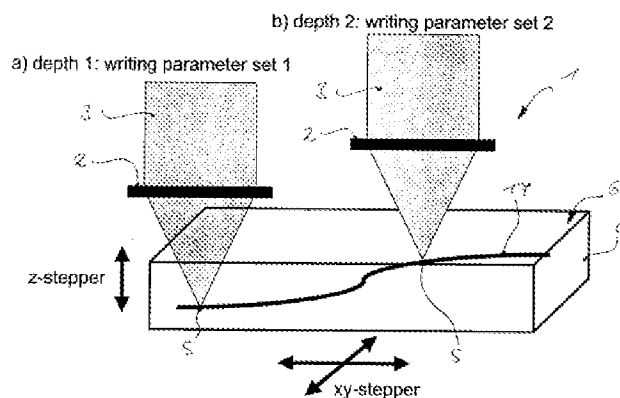


Fig. 5: 3D Writing Method



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9. Verfahren zur Herstellung eines optischen Verzweigers, insbesondere eines Mehrfach-Strahlteilers, insbesondere nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß das durch Licht änderbare Material (4) aus der Gruppe ausgewählt ist, die Gläser, 45 Kristalle und Glaskeramiken umfasst, welche bei einer Schreibwellenlänge im Bereich von 300 nm bis 1700 nm, besonders bevorzugt bei einer Schreibwellenlänge von ca. 400 nm, ca. 620 nm, ca. 800 nm, ca. 1060 nm und/oder ca. 1350 nm und bei der Wellenlänge des geführten Lichtes vorzugsweise im Bereich von 1250 nm bis 1600 nm im wesentlichen transparent sind.

Re claim 3, Will et al a method according to claim 1 or 2 in which the altered region of the crystal comprises a waveguide. See figures 1-6 for clear teaching of waveguide and see claim 9 for the teaching of crystal as an alternative to silica glass (see figure 4).

Re laser crystal, all structure following preamble is met as discussed in claim 26 above. The claim recitation *a laser crystal for producing a laser beam* and the claim 28 recitation *a laser cavity* have not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Re claim 29, see paragraph [0065] and claim 9 for the suggestion of crystal that is optically transparent. Thus, the materials of YAG, Forsteryte, Vanadate, LiSAF, GSGG or Sapphire are implicit.

[0065] In überraschender Weise war die Erfindung nicht auf einzelne Gläser beschränkt sondern ließ sich im Wesentlichen bei vielen transparenten Materialien, wie beispielsweise Gläsern, Glaskeramiken und Kristallen realisieren.

Re claim 51, the method step of **focusing** a pulsed laser beam at a desired position within the material and **moving** the focused beam along a path such that the focused beam alters the refractive index of the region of the material along the path has been discussed regarding applicants claim 1 above. Re the method step of **refocusing** a pulsed laser beam at a second desired position within the material and **moving** the focused beam along a second path separated from the first path such that the focused beam alters the refractive index of the region of the material along the second path, see figure 3 which shows a two step writing method and see in particular the STEP 2.

Re claims 52-53, see figure 4 which shows the first and second paths (10, 18) are separated by a substantially constant distance.

Re claim 53, the recitation **capable** of operating as carrier of a common supermode, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Re claim 58 which relates to the average refractive index of the region being decreased, Will et al teaches the refractive index changes due to the laser writing of the crystal, see e.g. claim 3. As such the average refractive index of the region being either

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decreased or increased is inherent in that teaching. Further, all method steps have been met, it would follow that the intended result of the average refractive index of the region being decreased is met.

Re claim 59 which relates to the refractive index of the region being increased in part and decreased in other parts. Will et al teaches the refractive index changes due to the laser writing of the crystal, see e.g. claim 3. As such the refractive index of the region being increased in part and decreased in other parts is inherent in that teaching.

Claims 60-61 are rejected under 35 U.S.C. 102(b) as being anticipated by Kato et al (JP 06-224510). Kato et al discloses the claimed invention of a laser formed by a waveguide inscribed in a crystal of YAG lodged with Nd³⁺. See abstract and figure 1.

Claims 60-61 are rejected under 35 U.S.C. 102(b) as being anticipated by Kahen (5,276,699). Kahen discloses the claimed invention of a laser formed by an effective waveguide having a cladding of depressed refraction index (see the abstract).

[57]

ABSTRACT

A stabilized depressed-index cladding ridge waveguide semiconductor laser diode having a graded (index of refraction) lower cladding layer.

Claims 60-61 are rejected under 35 U.S.C. 102(b) as being anticipated by Keaton et al (6563995). Keaton discloses the claimed invention of a laser (10, see also abstract, second from last line) formed by an effective waveguide having a cladding of depressed refraction index (16) where the core of unmodified material (12) is

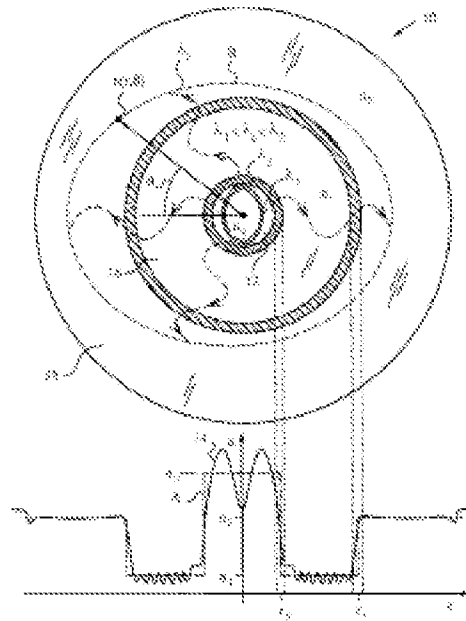
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surrounded, at least in part, by a number of tracks comprising material modified in a way to mainly decrease the refractive index.

(57)

ABSTRACT

An apparatus and a method for separating a light of a first wavelength λ_1 from a second wavelength λ_2 , where $\lambda_1 < \lambda_2$, in a waveguide such as an optical fiber is described. The apparatus includes a core surrounded by a depressed cladding, which itself is surrounded by a secondary cladding. The core cross-section, the depressed cladding cross-section, the secondary cladding cross-section, and the refractive indices of the core, the depressed cladding and the secondary cladding are selected to produce a fundamental mode cutoff wavelength λ_c such that $\lambda_1, \lambda_c < \lambda_2$, and produce a high loss in the secondary wavelength λ_2 . The apparatus can be used as a filter, an amplifier, a laser, or in a nonlinear optical switch.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13-15, 30-31, 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Will as applied above. Will has been discussed except for the metal dopant. Examiner asserts that this is well-known in a laser crystal to have a metal dopant. It would have been obvious to one of ordinary skill in the art to modify Will by

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employing a metal dopant, as is well-known, so as to gain the advantageous benefit of improving the light output efficiency of the laser crystal.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to QUYEN P. LEUNG whose telephone number is (571)272-8188. The examiner can normally be reached on normally M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Quyen Leung/
Quyen P Leung
Primary Examiner
Art Unit 2874

qpl